

with its attendant instructors, gets right to the people requiring instruction and in a mood to absorb and benefit by any information imparted. The large railway companies on the American Continent undertake this agriculture train service purely as a business proposition, fully convinced that the result will be increased traffic in agricultural and pastoral products over their lines. No better testimony to the effectiveness of this kind of instruction is required. I should like to see the present system of exhibition at shows abandoned for a year, and a properly equipped agriculture train service to tap backward districts given a fair trial. I do not think that any other single expedient could do more to popularize the Department and increase its efficiency.

I would like also to emphasize the importance of developing a system of seed associations on lines similar to those adopted by the Iowa and Wisconsin Experimental Associations, to which reference has been made. It cannot be said that any adequate provision for the growing and dissemination of seeds adapted to the requirements of the various districts of New Zealand has been made. On the other hand, the Department has frequently recommended varieties for particular conditions, only to be stultified by the intelligence that the varieties in question were not obtainable or were obtainable in doubtful purity. This should not be so. Every variety produced at the experimental farms or otherwise acquired should be carefully multiplied under prescribed conditions, its purity safeguarded, and its dissemination assured.

In another direction the educational system throughout North America makes a deep impression, and that is in the enormous quantity of so-called literature that is available for the farmer. These farm bulletins are almost entirely free, and are circulated broadcast, while in many cases they are posted to every member of farming associations, farmers' clubs, and so on.

And, finally, the most admirable feature of the whole system is the reduction of all teaching and printing communications to the most simple words. Technical and scientific names are not lost sight of, but they are not employed where the education of the farmer is concerned. Instructions to farmers are couched in the most simple terms available, and this policy is insisted on most rigorously.

*The Great Unused National Asset.*—Nature has been lavish with her favours to the Dominion of New Zealand. Within its tide-swept shores is to be found scenery of unsurpassed variety and sublime grandeur. It has one of the finest climates in the world, with a rainfall in normal years spread generally over the entire season, and at most times considered sufficient; a soil eminently suitable for agricultural and pastoral pursuits, a good deal of which can be classed as equal to any in the universe for productiveness, and which is prepared to respond to the well-directed labour of the practical farmer. In the majestic everlasting snow-clad mountains, glaciers, vast mountain-bound lakes situated at high altitudes, noble rivers, and lofty waterfalls, Nature has provided New Zealand with an asset, a power, and a wealth beyond estimate, which as yet remains practically untouched, but which can be utilized and bent to the will of man.

Hitherto the Dominion has succeeded in producing apparently sufficient to satisfy her present-day requirements and aspirations without using these vast water assets, but if she is to hold her own in the markets of the world these latent resources of power and wealth must be brought into being and harnessed to the national industry to reduce the cost of production. The waters should no longer be allowed to flow to the sea, as at present, as a waste product of nature, but by gravity be used in irrigating the vast plateaus, plains, and river-basins which may be considered irrigable, and thus bring lands hitherto of little or no value to produce crops profitable not only to the grower but to the Dominion at large.

In traversing the United States and Canada any observant person must note how these national assets are everywhere being taken advantage of and put to profitable use both for power and irrigation, and how the arid and practically desert lands under the benign influence of plenty of water are made to produce and "bloom and blossom like the rose."

Irrigation has become a science, one of the newest of agricultural sciences. Irrigation farming has been practised for many years, but it is only recently that the best methods of applying water, quantity to use and proper time to use it, have received scientific thought and investigation. The agricultural possibilities in regard to the producing of crops when water is available for irrigation purposes are now so universally recognized in both the United States and Canada that where irrigable land is situated for which no gravity water is available, or only available at a very high cost, and which may be situated at a moderate elevation above rivers or lakes, for such conditions the development of a water-supply by pumping is being resorted to and found the best solution. For pumping from these sources the centrifugal pumps and the power-plunger pumps are considered the best adapted. Simple centrifugal pumps specially designed and driven at a sufficiently high rate of speed may be used for lifts considerably over 100 ft. The large sock-pump is not suitable for lifts over 75 ft. For higher lifts compound or multi-stage centrifugal pumps are used. These consist of two or more pumps connected in series; the discharge of the first pump or stage is delivered into the suction of the next pump, and the operation is repeated according to the number of stages. Usually 75 ft. to 125 ft. is allowed to each stage. There is a limit, however, beyond which it is not economically feasible to pump. In Southern California, in the citrus district, lifts above 400 ft. have been profitable, and in British Columbia equally high lifts are considered profitable for good apple-orchards, but in all cases the area irrigated must be considerable, otherwise the cost will be too great.

With regard to the promotion of irrigation farming, it is considered an essential part of the programme that the survey and classification of soils in districts would have to be undertaken by the Government, and also irrigable and non-irrigable lands defined.